No. 833,473. PATENTED OCT. 16, 1906.

G. MESTA.

BLOWING ENGINE VALVE.

APPLICATION FILED MAR. 6, 1903.

2 SHEETS—SHEET 1.

Fig. 3.

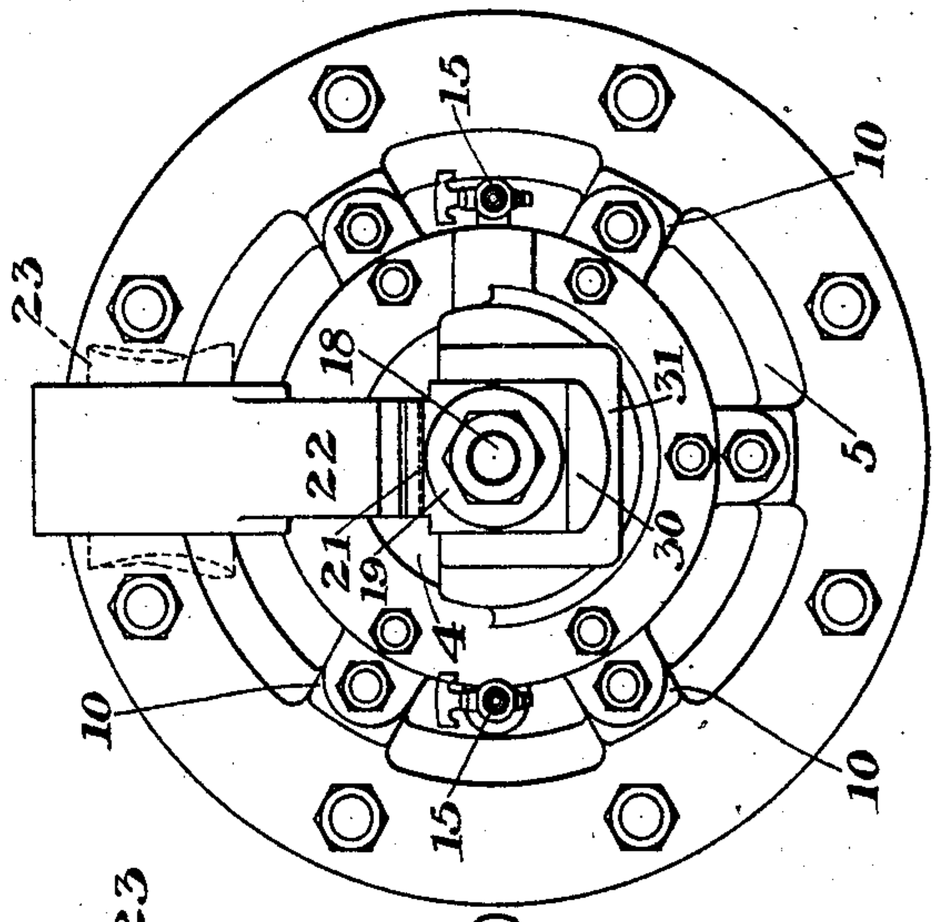
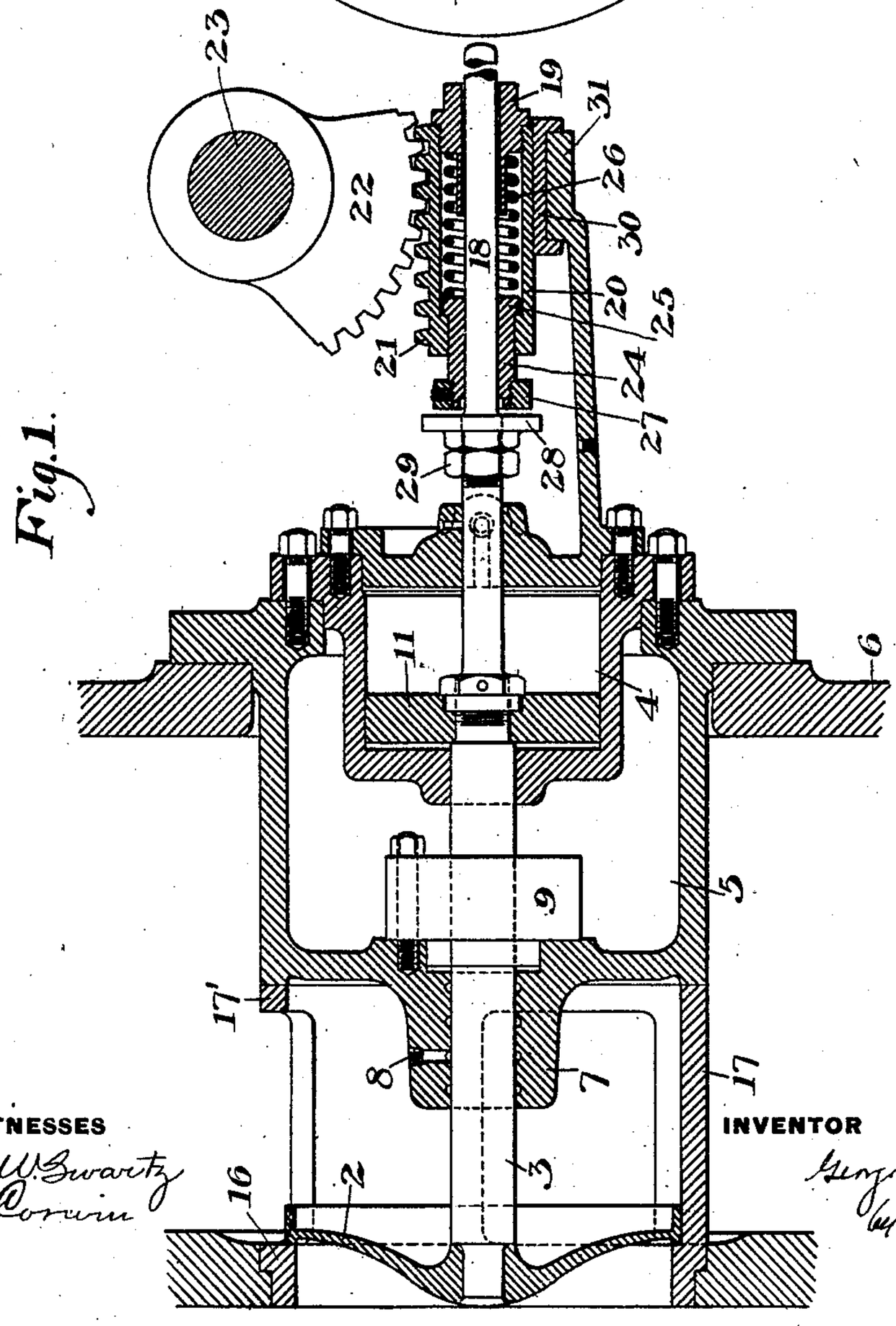


Fig. 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 4.

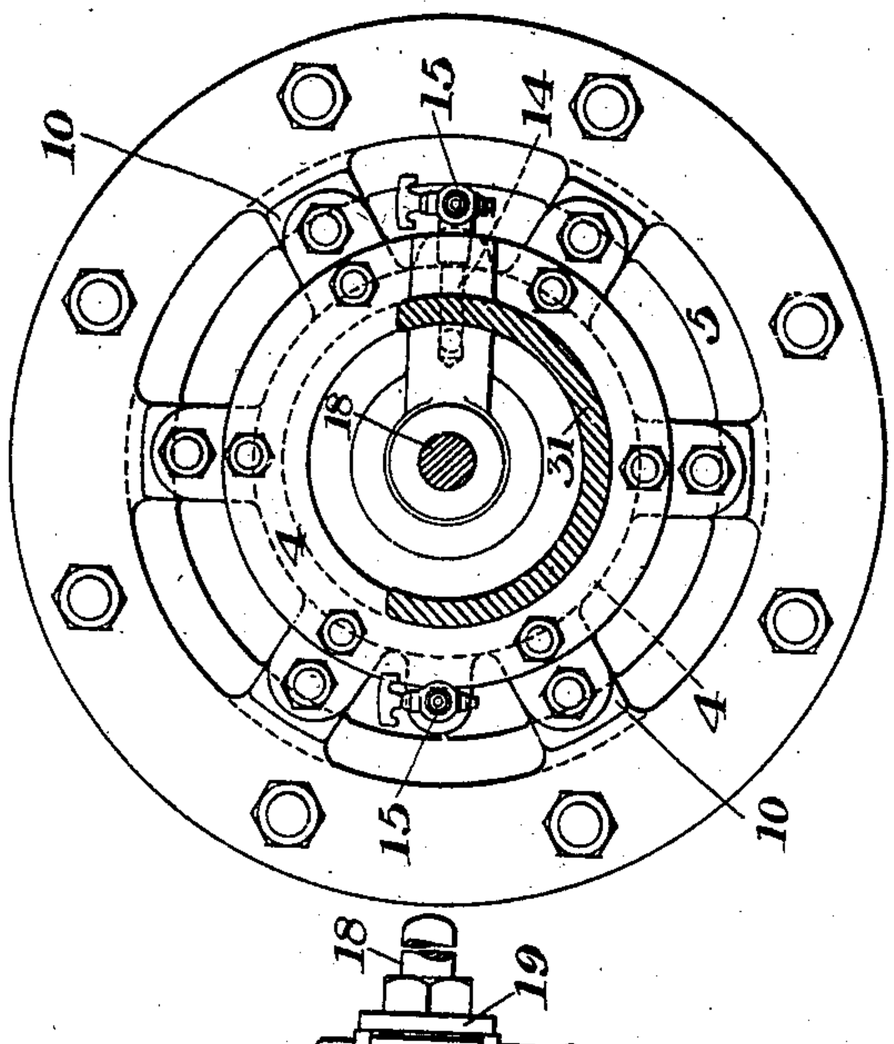
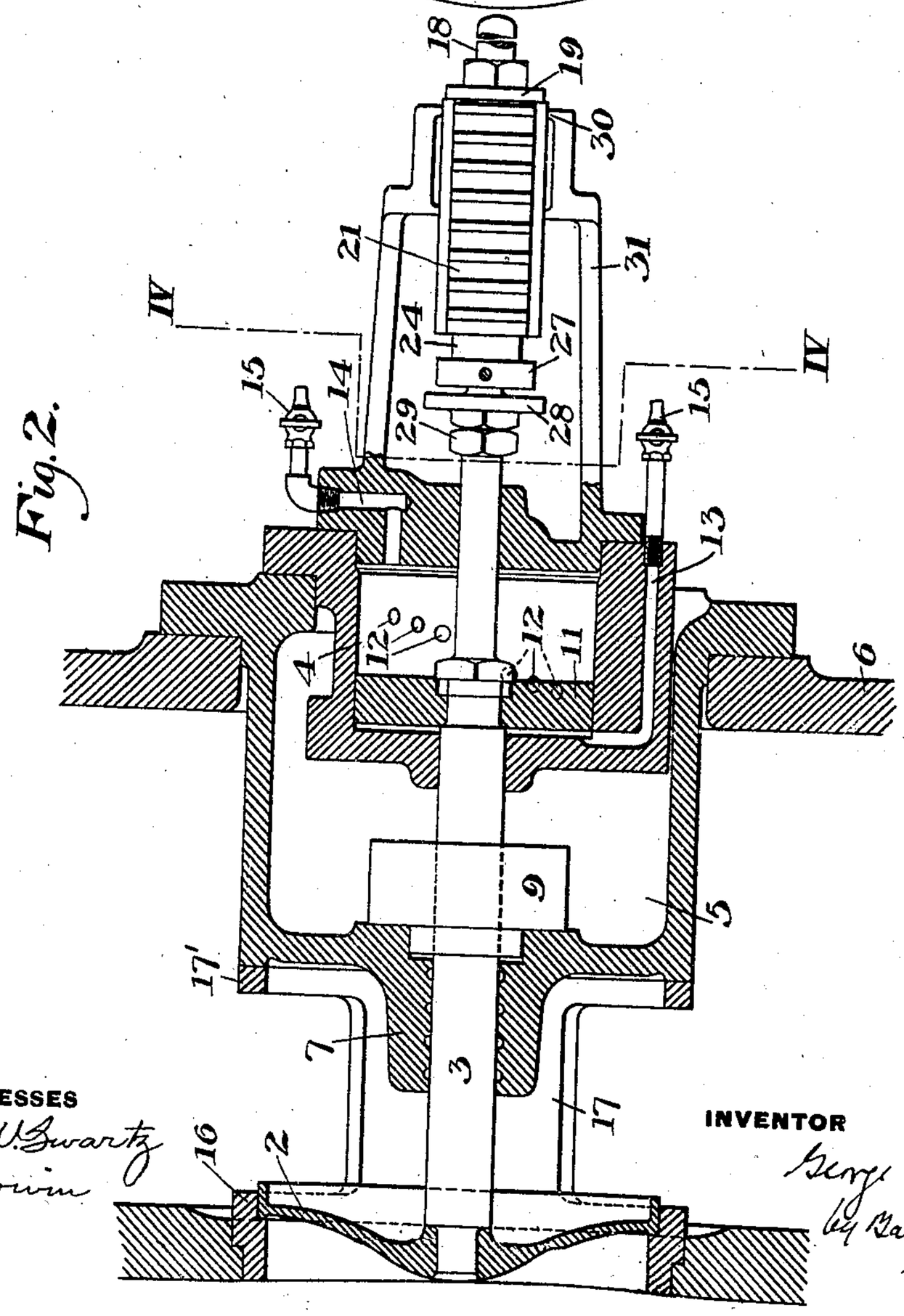


Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE MESTA, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO MESTA MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

BLOWING-ENGINE VALVE.

No. 833,473. Specification of Letters Patent. Patented Oct. 16, 1906.

Application filed March 6, 1903. Serial No. 146,584.

To all whom it may concern:

Be it known that I, GEORGE MESTA, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Blowing-Engine Valve, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional side elevation showing an outlet-valve provided with my improved actuating mechanism. Fig. 2 is a sectional top plan view at right angles to that of Fig. 1. Fig. 3 is a rear elevation; and Fig. 4 an elevation, partly in section, on the line IV IV of Fig. 2.

My invention relates to blowing-engine valve mechanism, and is designed to prevent pounding of the valve upon its seat, to cushion the valve movement in both directions, and to provide means for adjusting the cushioning action without stopping the operation of the engine or compressor, and to provide a stem which will visually show the movements of the valve in its stroke. It is also designed to prevent any leakage from the wind-box from affecting the operation of the valve, to prevent heating of the valve mechanism, and to hold the valve-seat firmly in position and guide the valve.

In the drawings, 2 represents an outlet-valve of a blowing-engine, having a stem 3 extending through a cushioning-cylinder 4, which is set within an inclosing chamber 5, preferably projecting into the wind-box, the outer cover of which is shown at 6. The chamber 5 consists of a hollow casting with a projecting bearing 7 for the valve-stem, which is preferably provided with oil-grooves, to which oil may be supplied through a pipe leading to a hole 8. The stem is packed where it passes through the head of this chamber, preferably by metallic packing, as indicated at 9, this being arranged to prevent air from leaking out around the rod or stem. The cylinder 4 is secured to the chamber by radial arms 10, secured to the outer flange of the chamber, so that any air which may leak from the wind-box into the chamber will pass out into the open air. The air circulation within this chamber also keeps the parts cool and prevents their becoming heated by the temperature of the compressed air forced into the wind-box. Within the cylinder 4 a piston 11 is secured to the valve-stem, and the cylinder is provided with an inclined series of side holes 12 for exhaust, which are gradually closed by the piston in its movement. As the piston nears the end of its travel in either direction it cuts off the last hole and then compresses the air to cushion the end of the valve movement. The air is gradually forced out through an outlet 13 in the inner head and an outlet 14 in the outer head, the area of each outlet being adjustable. For this purpose I show pipes having petcocks 15 and connected to these outlets. To hold the valve-seat 16 in place and hold and guide the valve, I preferably employ an apertured cage 17, which is preferably integral with the seat and has an end ring 17′ fitting against the end of the chamber 5. The inner diameter of the cage is a neat fit around the valve, and it acts as a guide for the valve when horizontal to prevent its dropping. On a vertical valve it acts to hold the seat, and if the valve breaks off the stem it holds it from passing into the receiver.

The outer portion 18 of the valve-stem is preferably reduced in diameter and moves through a screw-plug 19 in the outer end of a hollow casing 20, having a rack 21, engaged by segmental gear 22, secured to rock-shaft 23, which is rocked by suitable connection with the moving parts of the engine. Within the inner end of the tube 20 is a bushing 24, having an enlarged inner end 25, against which abuts the end of a spiral spring 26, the other end of which engages the plug 19. The outer screw-threaded head 27 of the bushing 24 is adapted to engage an adjustable ring 28, held by lock-nut 29 on the valve-stem. The tube 20 moves within a guiding-support 30, secured to a bracket 31, projecting outwardly from the head of the cushioning-cylinder, this bracket preferably being of semi-circular form.

In the operation of the device the valve is positively closed by the rock-shaft acting through the tube and screw-plug and thence through the spring and bushings. As the valve is forced to its seat the air is forced out of the cushioning-cylinder, the cushioning action at the end of the stroke being regulated by the adjustable outlet. The piston in the cushioning-cylinder does not quite reach the end of its stroke as the valve seats. When the valve is seated, the rock-shaft is actuated to move the tube back along the

valve-stem extension, and when the pressure in the cylinders exceeds the wind-box pressure the outlet-valve is forced open, thus forcing the piston 11 to the other end of its travel, the opening movement being cushioned by the adjustable outlet in its outer head. The stem is of such length that its end is visible and freely accessible in all positions of the parts, and I am thus enabled to see at all times whether the valve is making its proper stroke. This feature will be appreciated by those skilled in the art.

The advantages of my invention result from the peculiar combination which protects the cushioning-cylinder and cools it by the air circulation, also from the improvements hereinafter claimed. The chamber for the cushioning-cylinder may be outside the wind-box. The valve mechanism may be used for hydraulic or other cylinders and may also be used for the inlet-valves of blowing engines or compressors and many other variations may be made in the form and arrangement of the parts without departing from my invention.

I claim—

1. A blowing-engine having a wind-box communicating with the receiver, a closed cooling-chamber projecting into the wind-box and open to the outer air, a cushioning-cylinder projecting into the cooling-chamber and containing a piston, and an outlet-valve having its stem connected to the piston of the cushioning-chamber; substantially as described.

2. A blowing-engine having a closed chamber projecting into its outlet, and a valve having a cushioning-cylinder projecting into the chamber with openings to allow circulation of air in said chamber; an annular space being provided around the cushioning-cylinder within the closed chamber substantially as described.

3. A blowing-engine valve having a stem, a chamber surrounding said stem and open to the air, and a cushioning-cylinder projecting into said chamber, said stem passing through said cushioning-cylinder; substantially as described.

4. A blowing-engine valve having a stem, a chamber surrounding said stem and open to the air, a cushioning-cylinder projecting into said chamber, said stem passing through said cushioning-cylinder, and actuating means intermediate the ends of said stem for closing the valve; substantially as described.

5. A blowing-engine valve having a stem, a chamber surrounding said stem and open to the air, and a cushioning-cylinder projecting into said chamber and open at both ends to the air, said stem passing through said cushioning-cylinder; substantially as described.

6. A blowing-engine valve having a stem, a chamber surrounding said stem and open to the air, and a cushioning-cylinder projecting into said chamber and open to the air at a plurality of points intermediate the ends, said stem passing through said cushioning-cylinder; substantially as described.

7. A blowing-engine valve having a stem, a chamber surrounding said stem and open to the air, a packing surrounding the valve-stem at the inner head of the chamber, and a cushioning-cylinder projecting into said chamber, said stem passing through said cushioning-cylinder; substantially as described.

8. A blowing-engine valve having a stem, a chamber surrounding said stem and open to the air, a cushioning-cylinder projecting into said chamber, said stem passing through said cushioning-cylinder, and mechanical connections acting upon the outer extension of the valve-stem and arranged to positively close the valve; substantially as described.

9. A blowing-engine having an outlet-valve, an apertured cage around the valve arranged to hold the valve-seat in place, said cage having portions arranged to engage the outer surface of the valve-body and guide it, means for retaining the cage and seat in position, and connections for positively closing the valve; substantially as described.

10. A blowing-engine having an outlet-valve, a valve-cage and guide divided into two chambers and located within the wind-box, one of the chambers forming a cooling-chamber open to the outer air, a cushioning-cylinder projecting into the latter chamber, and a piston secured on the valve-stem within said cushioning-cylinder; substantially as described.

11. A blowing-engine having a wind-box, an outlet-valve therein, a cooling-chamber projecting into the wind-box, a guide surrounding the valve, said cooling-chamber being open to the outer air, a cushioning-cylinder projecting into the cooling-chamber and having holes opening thereinto, and a piston in the cushioning-cylinder secured to the valve-stem of the outlet-valve; substantially as described.

In testimony whereof I have hereunto set my hand.

GEORGE MESTA.

Witnesses:
GEO. B. BLEMING,
H. M. CORWIN.